

each arm in combination with the respective brush body thereof having a different respective natural resonance frequency of oscillation.

44. A brush assembly as in claim 43, in which the brush bodies have different weights so as to provide said corresponding different frequencies.

45. A brush assembly as in claim 44, wherein said brush bodies have different sizes, thereby having said different weights.

46. A brush assembly as in claim 44, wherein said brush bodies contain respective materials having different densities so as to have said different weights.

47. A brush assembly as in claim 43, wherein said first and second support arms have different respective resiliencies so as to have said different frequencies. *same as claim 43*

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~~48. A brush assembly as in claim 47, wherein parts of said first and second support arms are made of different materials so as to provide said different respective resiliencies.~~

49. A brush assembly as in claim 47, wherein part of one of said first and second support arms has a different dimension from a corresponding part of the other support arm for providing said different respective resiliencies.

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~~50. A brush assembly as in claim 47, wherein at least one of said first and second support arms has an aperture formed therein for providing said different respective resiliencies.~~

51. A brush assembly as in claim 43, wherein each said brush body is mounted by an interference fit in an aperture in the respective support arm thereof.

~~52. In combination, a direct current electric motor having said generally cylindrical commutator, and having the brush assembly according to claim 43.~~

53. A brush assembly as in claim 43, wherein said different resonant frequencies enable the two brush bodies to provide reliable electrical contact between said first and second support arms and said commutator, by reducing interface resistance between the brush bodies and the commutator, despite oscillations of said arms and brush bodies which occur in response to rotation of said commutator.

54. A brush assembly as in claim 43, further comprising:

third and fourth resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to said longitudinal axis of said DC electric motor when said assembly is mounted in the motor, said third and fourth support arms being connected electrically in parallel, and carrying respective third and fourth brush bodies which are arranged for contacting said generally cylindrical commutator of the motor, the commutator having a plurality of circumferential segments and the third and fourth brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor.

55. A brush assembly as in claim 54, wherein said third and fourth support arms in combination with the respective brush bodies thereof have different respective natural resonance frequencies of oscillation.

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56. A brush assembly as in claim 55, wherein said different resonant frequencies enable the third and fourth brush bodies to provide reliable electrical contact between said third and fourth support arms and said commutator, by reducing interface resistance between the brush bodies and the commutator, despite oscillations of said arms and brush bodies which occur in response to rotation of said commutator.

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57. A brush assembly as in claim 54, wherein the third and fourth brush bodies are substantially diametrically opposite the first and second brush bodies with respect to said motor axis.

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58. In combination, a direct current electric motor having said generally cylindrical commutator, and the brush assembly according to claim 54.

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59. An electric motor brush assembly mounted in a DC electric motor, said brush assembly comprising:

first and second resilient, electrically conductive brush supports, the supports carrying respective first and second brushes which are thereby arranged for contacting a generally cylindrical commutator of the motor;

the supports being mounted to a common base which is spaced from a longitudinal axis of the motor and the brushes extending toward a common circumferential region of said commutator;

said first support and brush having a first resonant frequency, said second support and brush having a second resonant frequency, and said first and second resonant frequencies being different.

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60. A brush assembly as in claim 59, wherein said supports are connected electrically in parallel with each other, and are arranged in the assembly for being axially spaced from each other with respect to said longitudinal axis of said motor.

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61. A brush assembly as in claim 60, further comprising an end cap, said supports being mounted on said end cap, said brushes being mounted on said end cap via said supports for contacting the commutator of the motor, said commutator having a circumference, and said brushes being mounted so as to be at substantially a common position around said circumference.

62. A brush assembly as in claim 61, wherein said commutator has a plurality of circumferential segments and said first and second brushes are mounted so as to be capable of contacting a common one of said segments simultaneously.

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63. A brush assembly as in claim 61, further comprising third and fourth supports mounted on said end cap and third and fourth brushes mounted on said end cap via said third and fourth supports for contacting the commutator of the motor, and said third and fourth brushes being mounted so as to be at substantially a common position around said circumference, said common position being different from the common position of said first and second brushes.

64. A brush assembly as in claim 63, said third support and brush having a third resonant frequency, said fourth support and brush having a fourth resonant frequency, and said third and fourth resonant frequencies being different.

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~~65. A brush assembly as in claim 64, wherein said~~
different resonant frequencies enable the third and fourth brushes to provide reliable electrical contact between said third and fourth supports and said commutator, by reducing interface resistance between the brushes and the commutator, despite oscillations of said supports and brushes which occur in response ~~to rotation of said commutator.~~

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66. A brush assembly as in claim 63, wherein said commutator has a plurality of segments and said third and fourth

brushes are mounted so as to be capable of contacting a common one of said segments simultaneously.

67. A brush assembly as in claim 63, wherein the first and second brushes are substantially diametrically opposite the third and fourth brushes with respect to said motor axis.

68. A brush assembly as in claim 59, wherein a portion of said first brush has a different shape than a corresponding portion of said second brush for causing said first frequency to be different from said second frequency.

69. A brush assembly as in claim 59, wherein a portion of said first brush has a different size than a corresponding portion of said second brush for causing said first frequency to be different from said second frequency.

70. A brush assembly as in claim 59, wherein said first brush has a material which has a different density than a corresponding material in said second brush for causing said first frequency to be different from said second frequency.

71. A brush assembly as in claim 59, wherein a portion of said first support has a different resiliency than a corresponding portion of said second support for causing said first frequency to be different from said second frequency.

~~72. A brush assembly as in claim 71, wherein said portions of said supports are made of different resilient materials, thereby having said different resiliencies.~~

73. A brush assembly as in claim 71, wherein said portions of said supports have a different dimension, thereby having said different resiliencies.

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74. ~~A brush assembly as in claim 71, wherein one of~~
said portions has a slot formed therein, which provides said
~~different resiliencies.~~

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75. A brush assembly as in claim 59, wherein each said
brush is mounted by an interference fit in an aperture in the
respective support thereof.

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76. ~~A brush assembly as in claim 59, wherein said~~
different resonant frequencies enable the first and second
brushes to provide reliable electrical contact between said first
and second supports and said commutator, by reducing interface
resistance between the brushes and the commutator, despite
oscillations of said supports and brushes which occur in response
~~to rotation of said commutator.~~

77. An electric motor brush assembly for being mounted
in a DC motor comprising:

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first and second resilient, electrically conductive
supports arranged for being mounted in such motor, the supports
carrying respective first and second brushes which are thereby
arranged for contacting a commutator of such motor when the
assembly is mounted in the motor;

the supports being axially spaced from each other along
said axis of said motor and the supports having substantially
equal lengths;

said first support and brush having a first resonant
frequency, said second support and brush having a second resonant
frequency, and said first and second resonant frequencies being
different.

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78. ~~In combination, a direct current electric motor~~
having said commutator, said ~~communication~~ being generally
~~cylindrical, and the brush assembly according to claim 77.~~